

SHELF WITH RETAINING WALL

5           The present application claims priority from provisional application serial no. 60/407, 441, which is herein incorporated by reference in its entirety.

TECHNICAL FIELD AND BACKGROUND OF THE INVENTION

10           The present invention relates to a shelf with a retaining wall and, more particularly, to a shelf that is suitable for use as a rotatable shelf, such as in a Lazy Susan assembly.

15           Rotatable shelves are well known and have been in kitchen cabinetry to provide access to remote spaces, for example in corner cabinets. These rotatable shelves have become quite popular because without it, considerable cabinet space in the corner either above or below the kitchen counter is wasted due to the inaccessibility of the space at the back of the cabinet. However, when the shelves are rotated, it is not uncommon for the products supported on the shelf to be jettisoned off the shelf as a result of the centrifugal forces that occur as a result of the rotation of the shelf. Furthermore, in order to accommodate the variations and tolerances of the various components forming the shelf assembly, the hub assemblies, which are used to mount the shelves, often permit play between the center post of the shelf assembly and hub assembly. While this play between the hub assembly and the center post may appear to be quite minimal at the center post, it results in significant deflection at the edge of the respective shelves.

20           Consequently, there is a need for an improved rotatable shelf assembly, which will provide better retention of the products on the respective shelves and, further, which will provide reduced deflection of the shelves, while still achieving the easy access to the products on the shelf assembly.

SUMMARY OF THE INVENTION

25           Accordingly, in one form of the invention a shelf includes a plate member, a band, and plurality of posts, which are mounted to the plate member. Each of the posts includes a slot, which receive the band and support the band to form a fence or wall around at least a portion of the plate member.

30           In one aspect, the plate member includes a plurality of spaced openings, with the posts including proximal ends that are positioned in the openings and the slots extending to the distal ends of the posts. In a further aspect, the posts each include caps, which are mounted on the distal ends over the slots to thereby retain the band in the slots of the posts.

In one aspect, the plate member includes a perimeter portion, with the openings spaced along the perimeter portion wherein the band forms a perimeter fence or wall.

5 In other aspects, each of the posts includes a base portion and a projecting portion. Each of the base portions is positioned in a respective opening provided in the plate member and has a smaller diameter than its respective projecting portion. Further, each of the projecting portions rests on the plate member around a respective opening of the plate member.

10 According to another form of the invention, a rotatable shelf assembly includes a center post and at least one shelf that is mounted to the center post. The shelf includes a plate member, a band, and a plurality of posts, which are mounted to the plate member. Each of the posts includes a slot, which receives the band and supports the band to form a fence around at least a portion of the plate member.

15 In one aspect, the plate member includes a through-hole which extends through the plate member, with the center post extending through the through-hole. Preferably, the through hole comprises a center through-hole located generally in the center of the plate member. The plate member is rotatably mounted to the center post by a hub assembly that is adapted to accommodate a range of center post diameters and yet maintain a close fit with each center post to minimize play between the center post and the hub and, 20 thereby, reduce the deflection of the shelf.

From the forgoing, it can be appreciated that the shelf of the present invention is provided with a simple construction and, further, can be used as a rotatable shelf, such as in a Lazy Susan assembly. In addition, the rotatable shelf assembly exhibits minimal deflection at the outermost portion.

25 These and other objects, advantages, purposes, and features of the invention will become more apparent from the study of the following description taken in conjunction with the drawings.

#### DETAILED DESCRIPTION OF DRAWINGS

30 FIG. 1 is a perspective view of a rotatable shelf assembly incorporating a shelf of the present invention shown mounted in a cupboard;

FIG. 2 is a similar view to FIG. 1 with the shelf assembly removed from the cupboard for clarity;

FIG. 3 is an exploded perspective view of the rotatable shelf assembly of FIG. 1;

FIG. 4 is a perspective view of one of the shelves of the rotatable shelf assembly of FIG. 1;

FIG. 5 is a top plan view of the shelf of FIG. 4;

FIG. 6 is an exploded enlarged perspective view of the post and cap of the shelf of the present invention;

FIG. 7 is a bottom plan view of a hub assembly that mounts a shelf to the center post of the shelf assembly of the present invention;

FIG. 8 is an exploded view of another embodiment of the hub assembly of the present invention;

FIG. 9 is a plan view of the hub assembly parts of FIG. 8;

FIG. 10 is a perspective view of another embodiment of a rotatable shelf assembly of the present invention;

FIG. 11 is a side elevation view of one of the shelves of the shelf assembly of FIG. 10;

FIG. 12 is a perspective view of the shelf of FIG. 11; and

FIG. 13 is a top plan view of the shelf of FIG. 11.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIG. 1, the numeral 10 generally designates a shelf of the present invention. Shelf 10 has particular application as a rotatable shelf 12, such as in a Lazy Susan assembly, and, as will be more fully described below, provides a retention mechanism so that when the shelf is rotated, items supported on the shelf will remain on the shelf and not be jettisoned off the shelf when the shelf is rotated. However, it can be appreciated that shelf 10 may be used as a stationary shelf. For example, shelf 10 may be particularly useful in a boat, such as in the galley of a boat.

As best seen in FIG. 2, rotatable shelf assembly 12 includes a center post 14 and a plurality of hub assemblies 16, which rotatably mount the respective shelves 10 to the center post 14. Hub assemblies 16 are configured to provide stability to the respective shelf and, further, to permit vertical adjustment of the shelf along the center post. As best seen in FIG. 2, each hub assembly 16 includes a base 17 with an enlarged flange 18. Flange 18 mounts to the underside 10a of a respective shelf by fasteners. Further, each hub assembly 16 includes a central collar 20 which is dimensioned to receive shaft 14 and further is mounted

on the center post by a pin 15 that extends through shaft 14 and on which collar 20 rests. Flange 18 and collar 20 are reinforced by concentric annular flanges 21a, 21b, and 21c that may include one or more interconnecting webs 22a to further stiffen flange 18 and collar 20. When pin 15 is extended through shaft 14, both collar 20 and flange 21a rest on pin 15. In addition, collar 20 and flange 21a have grooves 23 formed therein, which provide a home position for the shelf. In this manner, when a person rotates a shelf, the shelf will be free to rotate about shaft 14; however, when shelf 14 is moved to its home position, pin 15 will rest in grooves 23 so that it will be releasably fixed in the home position until a sufficient force is applied at the shelf to cause pin 15 to be guided out of recesses 23. As will be understood, recesses 23 preferably have angled side walls that provide a camming action on pin 15. In addition, flange 21b includes opposed abutments 23a and 23b, which center pin 15 in its extended position through shaft 14 and, further, provide a more stable mount, especially when the respective shelf is in its home position.

Center post 14 is mounted at its opposed ends in upper and lower brackets 22 and 24, which mount the rotatable shelf assembly in a cupboard or the like. Lower end 14a of post 14 includes a projecting shaft or pin 26, which is received by lower bracket 24 to thereby mount lower end 14a of post 14 in bracket 24. Upper end 14b of center post 14 includes a sleeve 28, which includes a cylindrical body 30 that extends into upper opening 14c of upper end 14b of center post 14 to provide vertical adjustment to the length of post 14. Upper portion 32 of sleeve 28 is cylindrical and engages a cylindrical flange 24 provided on upper bracket 22 to thereby rotatably mount upper end 14b of center post 14 to upper bracket 22.

As best seen in FIG. 3, each shelf 10 includes a plate member 40 and a fence 42, which forms a wall or retaining mechanism to retain products or articles supported on the support surface 40a of plate member 40. In the illustrated embodiment, plate member 40 comprises a circular wood plate member with a plurality of openings 40b, which receive a corresponding plurality of posts 44. It should be understood that posts 44 may be mounted to plate member 40 by other conventional means, for example a flanged socket, which is mounted to the surface of the plate member. Posts 44 are preferably metal posts, though posts 44 may be formed from other materials, such as plastic, wood, or a composite material. Posts 44 support a band 46 to form fence 42. Band 46 preferably comprises a metal band, such as stainless steel; though it should be understood that band 46 may be formed from wood, plastic, or a composite material.

In the illustrated embodiment, openings 40b are substantially evenly spaced around the perimeter of plate member 40, but it should be understood that the openings may extend only around a portion of plate member 40 and/or may be spaced unevenly. In addition, plate member 40 may have a second set of openings to form, for example, an inner fence or wall. Furthermore, though illustrated as following the perimeter of plate member 40, openings 40a may be arranged in an alternate pattern.

Each post 44 includes a base portion 48 and a projecting portion 50. Base portion 48 is sized to be inserted into openings 40b of plate 40 and, preferably, sized to form a friction fit with the respective openings of plate member 40. Projecting portion 50 has a larger diameter than base portion 48 and optionally rests on the upper surface 40a of plate 40 at its lower surface 50a when base portion 48 is inserted into a respective opening. Upper portion 50 includes an elongate slotted opening 52, which receives band 46 to support band 46 and to form fence 42. Optionally, each slotted opening 52 extends to distal end 44a of post 44 so that band 46 can be inserted into the respective posts through their distal ends. In addition, posts 44 include caps 54 that extend over the distal ends 44a of posts 44 to thereby capture band 46 in the respective post 44. Optionally and preferably, one or more caps 54 include a recess 54a that is sized to receive a distal end 44a of post 44 and, further, which is sized to compress opposed halves 50a and 50b of projecting portion 50 (formed by slotted opening 52) to thereby frictionally retain band 46 in the respective groove 52. For ease of manufacture, each cap may be adapted to compress the opposed halves 50a, 50b of the posts.

In the illustrated embodiment, band 46 is supported above support surface 40a of plate 40. However, it can be appreciated that elongate groove 52 may be extended to position band 46 at or near the upper surface 40a of plate 40. Alternately, though band 46 is illustrated as having a generally uniform height, band 46 may have enlarged portions between posts 44 to extend to the upper surface of the plate to thereby close the gap between the posts. Furthermore, while posts 44 are illustrated as having a generally cylindrical body with a circular cross-section, it can be appreciated that posts 44 may assume other configurations including a multi-faceted cross-section including a rectangular, square, or hexagonal or the like cross-section. Furthermore, base portion 48 of the respective posts may be slotted to provide a spring like engagement with the plate 40. In addition, as noted above the height of the band may vary and may, for example, extend up between the posts to increase the height of the fence. It should also be understood that band 46 may comprise a band with openings and may, for example, be formed from a wire mesh. In marine applications, the metal

components would preferably be formed from stainless steel; though it should be understood that other materials can be used.

Referring to FIGS. 8 and 9, hub assembly 16' of the present invention is similar to hub assembly 16 and includes a base 17' with an enlarged flange 18', which  
5 mounts to the underside of a respective shelf. Base 17' further includes a plurality of concentric annular flanges similar to the previous embodiment (only outer concentric flange 21c' is illustrated) and a projecting collar 20' which extends through base 17' for mounting the respective shelf to the shaft or center post of the shelf assembly. In the illustrated  
10 embodiment, projecting collar 20' includes a threaded portion 20a' and, further, a threaded ring or collar 20b' that mounts on threaded portion 20a'. In addition, collar 20' includes one or more slotted grooves or notches 20c' to form two or more collar portions so that when threaded ring 20b' is threaded on to threaded portion 20a', the collar portions of collar 20' will be compressed to provide a closer fit with the center post of the shelf assembly. In this  
15 manner, ring 20b' acts as a means to tighten collar 20' about the center post. By tightening the space between the collar and the center post, the space that may allow a conventional Lazy Susan to rock side to side will be significantly reduced while accommodating a greater range of center post tolerances. With this closer fit, the deflection of the respective shelf is also reduced. This eliminates vibration when the rotatable shelf is turned on the center post and thus makes the operation smoother. As a result, items stored on the shelf are even further  
20 less likely to be moved or vibrated off the shelf.

Referring to Figure 4, another embodiment 110 of the shelf of the present invention is illustrated. Shelf 110 is of similar construction to shelf 10 and includes a plate member 140 and a fence 142, which is formed from a plurality of posts 144 and a band 146. However, in the illustrated embodiment, plate member 140 comprised a pie shaped plate  
25 member, which permits the size of the respective shelves to be increased but also typically necessitates the respective shelves to be rotated to their home positions for the cupboard door to be closed.

Similar to shelf 10, shelf 110 may be mounted to a rotatable center post 114 by a hub assembly 116, which rotatably mounts the shelf to the center post in a similar manner  
30 to hub assembly 16 or 16' to form a rotatable shelf assembly 112 similar to shelf assembly 12.

While several forms of the invention have been showed and described, it can be appreciated that other modifications and changes can be made. For example, though

described as wood plate members, other materials may be used to form the respective plate members of the shelves. Furthermore, as noted, bands 46 and 146 and posts 44 and 144 may be made from other materials including wood, plastic, or composite materials. Furthermore, the respective fences may be formed from a plurality of band sections. For example, the ends  
5 of the respective band sections could overlap in the slotted openings of the respective posts. Furthermore, though illustrated with a single fence forming a perimeter wall, multiple fences may be used and/or the fence may be located elsewhere on the respective plate members and, further, may encompass or encircle only a portion of the respective plate members. In addition, though illustrated as generally following a perimeter of the plate member, the fence  
10 may assume different configurations, for example, a square perimeter fence or a circulate plate member.

While several forms of the invention have been shown and described, other forms will now be apparent to those skilled in the art. Therefore, it will be understood that the embodiments shown in the drawings and described above are merely for illustrative  
15 purposes, and are not intended to limit the scope of the invention which is defined by the claims which follow as interpreted under the principles of patent law including the doctrine of equivalents.